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Modification of the existing maximum residue levels for quizalofop (resulting from the use of propaquizafop) in lettuces and salad plants

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Abstract

In accordance with Article 6 of Regulation (EC) No 396/2005, the applicant Adama Agan Ltd submitted a request to the competent national authority in Italy to modify the existing maximum residue levels (MRLs) for propaquizafop/quizalofop in lettuces and salad plants to accommodate the intended SEU use of propaquizafop. The data submitted in support of the request were found to be sufficient to derive MRL proposals of 0.15 mg/kg for the intended SEU use of propaquizafop for the crops belonging to the crop group of lettuces and salad plants. The MRL proposals are expressed for a common residue definition that covers quizalofop and propaquizafop. Since the EU MRL is set at a higher level of 0.20 mg/kg, no modification of the MRL is currently required for the intended use. Adequate analytical methods for enforcement are available to control the residues of propaquizafop, expressed as quizalofop, in plant matrices under consideration. Based on the risk assessment results, EFSA concluded that the long-term and short-term intake of residues occurring in food from the existing uses of quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop and from the intended use of propaquizafop on lettuces and other salad plants, is unlikely to present a risk to consumer health.

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Summary

In accordance with Article 6 of Regulation (EC) No 396/2005, Adama Agan Ltd submitted an application to the competent national authority in Italy (evaluating Member State, EMS) to modify the existing maximum residue levels (MRLs) for the active substance propaquizafop in lettuces and salad plants. The EMS drafted an evaluation report in accordance with Article 8 of Regulation (EC) No 396/2005, which was submitted to the European Commission and forwarded to the European Food Safety Authority (EFSA) on 12 December 2018. To accommodate for the intended uses of propaquizafop on lettuce plants in southern Europe, the EMS proposed to raise the existing MRL for propaquizafop from 0.10 mg/kg to 0.15 mg/kg.

It is noted that a modification of the existing MRL for lettuce plants and the residue definition for propaquizafop was agreed in the Standing Committee on Plants, Animals, Food and Feed (PAFF committee) in February 2019. According to the new MRL regulation SANTE/10482/2018, which is not yet published, a tentative MRL of 0.2 mg/kg was established for all lettuce plants and the residue definition for propaquizafop was combined with quizalofop-P. The MRL for lettuce plants is tentative, since the number of available residue trials representative for the Good Agricultural Practice (GAP) of propaquizafop in the different crops belonging to the crop group of lettuces and other salad plants was not fully in line with the legal data requirements.

EFSA assessed the application and the evaluation report as required by Article 10 of the MRL regulation. Based on the conclusions derived by EFSA in the framework of Directive 91/414/EEC, the data evaluated under previous MRL assessments, including the review of the existing MRLs according to Article 12 of Regulation (EC) No 396/2005 (MRL review) and the additional data provided by the EMS in the framework of this application, the following conclusions are derived.

The metabolism of propaquizafop in leafy, root and pulses/oilseeds crop groups was evaluated in the framework of the MRL review, considering the available metabolism studies of propaquizafop and other ester variants of quizalofop-P. It was concluded that metabolism of propaquizafop and the ester variants of quizalofop-P is sufficiently elucidated.

Studies investigating the effect of processing on the nature of propaquizafop have not been performed. However, the studies with quizalofop (acid) were found to be sufficient to conclude that propaquizafop is not expected to degrade under standard processing conditions.

From the available rotational crop metabolism studies performed with propaquizafop in sugar beet, spinach and wheat, the MRL review concluded that metabolism in rotational crops proceeds in a similar pathway as in primary crops. No further data were required for the intended use on lettuce crops assessed under this application.

Based on the metabolic pattern identified in the crop metabolism studies with quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop, the results of hydrolysis studies, the toxicological significance of metabolites and the capabilities of enforcement analytical methods, the MRL review proposed a general enforcement and risk assessment residue definition for all quizalofop-P ester variants as 'the sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers)'. A decision to implement the revised residue definition and to replace the existing residue definitions for quizalofop (including quizalofop-P) and propaquizafop was taken at the PAFF committee in February 2019.

Sufficiently validated analytical enforcement methods based on high-performance liquid chromatography (HPLC) are available to measure residues in accordance with the new comprehensive residue definition. The methods allow quantification at or above the validated limit of quantification (LOQ) of 0.005 mg/kg (expressed as quizalofop (acid)) in lettuce crops.

The number of submitted residue trials on lettuce is sufficient to derive an MRL proposal of 0.15 mg/kg for quizalofop in accordance with the new residue definition for the intended southern Europe (SEU) use of propaquizafop. The results can be extrapolated to the whole group of lettuces and salad plants. Since the existing tentative EU MRL is set at a higher level of 0.2 mg/kg, no modification is proposed in the framework of the current assessment.

Considering that the intended GAPs assessed under the current application refer to less critical SEU GAPs for propaquizafop on lamb's lettuce, cresses, land cresses, Roman rocket, red mustards and baby leaf crops, the data provided for the current MRL application do not address the requested confirmatory data identified as unavailable for propaquizafop. Thus, the footnotes set in the draft MRL Regulation SANTE/10482/2018 should remain unchanged. However, if within the timelines defined to provide confirmatory data supporting residue trials for the critical GAP are not provided, the MRL proposal of 0.15 mg/kg derived in the current assessment could be used as an alternative fall-back MRL.

The occurrence of propaquizafop residues in rotational crops was investigated in the framework of the EU pesticides peer review and the MRL review. Based on available confined rotational crop studies conducted at twice the intended application rate of propaquizafop on lettuce, it is concluded that no residues are expected in rotational crops if propaquizafop is applied on lettuce according to the intended GAP.

Processing studies with salad crops have not been submitted in the framework of the current application and are not considered necessary, since the majority of lettuce is eaten fresh (except escarole). The submission of processing studies with escarole is not triggered but would be desirable.

Residues of propaquizafop in commodities of animal origin were not assessed since the crops under consideration are normally not fed to livestock.

The risk assessment was performed using EFSA Pesticide Residues Intake Model (PRIMO) revision 3, considering the acceptable daily intake (ADI) value set for quizalofop-P-ethyl and the acute reference dose (ARfD) set for quizalofop-P-tefuryl. The toxicological reference values were recalculated as quizalofop equivalents (ADI 0.0083 mg/kg body weight per day and ARfD 0.08 mg/kg body weight). The input values for the exposure assessment were the risk assessment values derived by the MRL review corresponding to the MRLs as established in the new MRL regulation (SANTE/10482/2018) and for maize as derived in the respective MRL application. For lettuce crops assessed in the current MRL application, the existing tentative MRLs were used as input values, considering that these uses are not fully supported by residue trials and the MRL can be used as a conservative surrogate for the risk assessment values.

The maximum estimated long-term dietary intake accounted for 26% of the ADI (NL toddler diet). No short-term intake concerns were identified.

EFSA concluded that the long-term and short-term intake of residues occurring in food from the existing uses of quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop is unlikely to present a risk to consumer health. Since the intended use of propaquizafop on lettuces and other salad plants leads to a lower MRL and lower risk assessment value, the conservative risk assessment assumptions cover the intended new uses. EFSA proposes to amend the existing MRLs as reported in the summary table below.

Full details of all endpoints and the consumer risk assessment can be found in Appendices B–D.

Code ^(a)	Commodity	Existing EU MRL ^(b) (mg/kg)	Proposed EU MRL (mg/kg)	Comment/justification
Enforcement residue definition: Sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers) (SANTE/10482/2018; EFSA, 2017)				
0251000	Lettuces and salad plants	0.2 ^(ft)	0.2 ^(ft)	The submitted data are sufficient to derive a MRL proposal of 0.15 mg/kg for the intended SEU use of propaquizafop. Since the tentative MRL derived in the framework of MRL review is based on a more critical GAP, the existing MRL should not be modified at the moment. If the confirmatory data requested in the framework of the MRL review will not be provided, the MRL proposal of 0.15 mg/kg can be used as a fully supported fall-back MRL representing a SEU GAP (1 application of 0.12 kg propaquizafop/ha, PHI 30 days). The existing tentative MRL and the proposed fall-back MRL are unlikely to pose a risk for consumers.

MRL: maximum residue level; GAP: Good Agricultural Practice; SEU: southern Europe; PHI: preharvest interval.

(a): Commodity code number according to Annex I of Regulation (EC) No 396/2005.

(b): EU MRLs and related footnotes voted on 21-22 February 2019, at the Standing Committee on Plants, Animals, Food and Feed (PAFF committee). Draft Regulation SANTE/10482/2018. Not yet published.

(ft): SANTE/10482/2018: The European Food Safety Authority identified some information on residue trials as unavailable for propaquizafop. When re-viewing the MRL, the Commission will take into account the information referred to in the first sentence, if it is submitted by [2 years after publication of SANTE/10482/2018], or, if that information is not submitted by that date, the lack of it.

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Assessment

Propaquizafop is the ISO common name for 2-isopropylidenaminoxyethyl (*R*)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionate (IUPAC). Propaquizafop is an ester variant of the active substance quizalofop-P. The active substance propaquizafop is approved as herbicide, together with the other ester variants quizalofop-P-ethyl and quizalofop-P-tefuryl. The chemical structures of the propaquizafop, quizalofop-P ester variants and their main metabolites are reported in Appendix E.

In accordance with Article 6 of Regulation (EC) No 396/2005, Adama Agan Ltd submitted an application to the competent national authority in Italy (evaluating Member State, EMS) to modify the existing maximum residue levels (MRLs) for propaquizafop in lettuces and other salad plants classified in the EU food classification under the code 0251000 (current residue definition: 'propaquizafop').

The EMS Italy drafted an evaluation report in accordance with Article 8 of Regulation (EC) No 396/2005, which was submitted to the European Commission and forwarded to the European Food Safety Authority (EFSA) on 12 December 2018. To accommodate for the intended uses of propaquizafop, the EMS proposed to raise the existing MRL for propaquizafop from 0.10 mg/kg to 0.15 mg/kg in lettuces and salad plants group.

The detailed description of the intended uses of the plant protection product containing propaquizafop is reported in Appendix A. It is noted that in the Evaluation report prepared by the EMS Good Agricultural Practices (GAPs) were reported for additional crops for which the modification of the MRLs was not required (i.e. witloof, chicory and spinach). Thus, these crops are not assessed in the framework of this reasoned opinion.

The review of existing MRLs according to Article 12 of Regulation (EC) No 396/2005 (MRL review) has been finalised for all quizalofop ester variants (propaquizafop, quizalofop-P-ethyl and quizalofop-P-tefuryl) (EFSA, 2017). In this reasoned opinion, EFSA also recommended a modification of the residue definition for enforcement (current residue definition: 'propaquizafop'; proposed new residue definition: 'quizalofop (sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers)'). The decision on the implementation of the modification of the existing residue definition and the amendment of the individual MRLs has been taken in the Standing Committee on Plants, Animals, Food and Feed (PAFF) meeting on 21–22 February 2019 (draft Regulation SANTE/10482/2018). The revised regulation was not published in the Official Journal at the time of publication of this reasoned opinion.

In the revised MRL legislation, implementing the new residue definition and the MRLs proposed by EFSA in the MRL review, tentative MRLs of 0.20 mg/kg will be established for all crops belonging to the crop group of lettuces and other salad plants; this MRL reflects the existing authorised southern Europe (SEU) GAPs of quizalofop-P-ethyl on lamb's lettuce, lettuce, escarole and the authorised SEU GAP of propaquizafop on lamb's lettuce, lettuce, escarole, cress, land cresses, Roman rocket/rucola, red mustards and baby leaf salad. The MRLs are tentative since for the authorised SEU uses of propaquizafop data gaps were identified.

EFSA assessed the application and the evaluation report as required by Article 10 of the MRL regulation. EFSA identified some points which needed further clarification, which were requested from the EMS. On 26 February 2019, the EMS submitted the requested information and a revised evaluation report (Italy, 2018), which replaced the previously submitted evaluation report.

EFSA based its assessment on the evaluation report submitted by the EMS (Italy, 2018), the draft assessment report (DAR) (Italy, 2005) prepared under Council Directive 91/414/EEC, the conclusion on the peer review of the pesticide risk assessment of the active substance propaquizafop and quizalofop-P (EFSA, 2009a,b), as well as the conclusions from the previous EFSA opinion on the review of the existing for quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop (EFSA, 2017).

For this application, the data requirements established in Regulation (EU) No 544/2011¹ and the guidance documents applicable at the date of submission of the application to the EMS are applicable (European Commission, 1997a,b,c,d,e,f,g, 2000, 2010a,b, 2017; OECD, 2011, 2013). The assessment is performed in accordance with the legal provisions of the Uniform Principles for the Evaluation and the Authorisation of Plant Protection Products adopted by Commission Regulation (EU) No 546/2011².

¹ Commission Regulation (EU) No 544/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards the data requirements for active substances. OJ L 155, 11.6.2011, p. 1–66.

² Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products. OJ L 155, 11.6.2011, p. 127–175.

A selected list of end points of the studies assessed by EFSA in the framework of this MRL application, including the end points of relevant studies assessed previously, are presented in Appendix B.

The evaluation report submitted by the EMS (Italy, 2018) and the exposure calculations using the EFSA Pesticide Residues Intake Model (PRIMo) are considered as supporting documents to this reasoned opinion and, thus, are made publicly available as background documents to this reasoned opinion.

1. Residues in plants

1.1. Nature of residues and methods of analysis in plants

1.1.1. Nature of residues in primary crops

The metabolism of propaquizafop in leafy, root and pulses/oilseeds crop groups was evaluated in the framework of the peer review under Directive 91/414/EEC in studies with ¹⁴C-propaquizafop either labelled on the phenyl or the quinoxaline moieties (EFSA, 2017).

Metabolism of propaquizafop in plants proceeds primarily via hydrolysis of the ester link to yield quizalofop-P, which generally represents the major component of the residue, accounting for up to 35% of the total radioactive residues (TRR) in lettuce at harvest. Propaquizafop was observed in immature plant samples collected within 15 days following the application and in mature soya beans and sugar beet roots, but in low amounts (ca. 7% TRR).

1.1.2. Nature of residues in rotational crops

The metabolism of propaquizafop in rotational crops was investigated in sugar beet, spinach and wheat sown at plant-back intervals (PBIs) of 30, 120 and 270 days after harvest of a primary crop (soybeans) treated twice with propaquizafop at 280 g/ha (EFSA, 2017).

The concentrations of TRR in all succeeding crops ranged from 0.004 mg eq./kg in sugar beet roots and foliage sown 270 days after the second treatment to 0.167 mg eq./kg in straw from spring wheat sown 30 days after the second treatment. The metabolic pathway in rotational crops was found to be similar to the primary crop metabolism. Parent material was extensively metabolised into numerous metabolites with the majority of the residue being incorporated into the lignin fraction. At all PBIs, the radioactive residues were mainly composed of quizalofop-P (up to 25% of TRR in spinach corresponding to 0.01 mg eq./kg), quizalofop-phenol and their hydroxy metabolites (up to 7.6% TRR corresponding to 0.003 mg eq./kg) (EFSA, 2017).

1.1.3. Nature of residues in processed commodities

Studies investigating the effect of processing on the nature of residues were performed with quizalofop (acid); these studies demonstrated that quizalofop (acid) is stable under conditions representative for pasteurisation, sterilisation and baking/brewing/boiling.

Studies with propaquizafop are not available. In the framework of the MRL review, it was decided that the studies with quizalofop (acid) are sufficient to conclude that propaquizafop is not expected to degrade under standard processing conditions (EFSA, 2017).

1.1.4. Methods of analysis in plants

Analytical enforcement methods for all ester variants were assessed in the framework of the MRL review. The residues of propaquizafop in plants can be measured with methods that involve the hydrolysis of propaquizafop to quizalofop with subsequent quantification of quizalofop by high-performance liquid chromatography with tandem mass spectrometry (HPLC–MS/MS). The method was sufficiently validated in matrices with high water, high oil content and in dry matrices at the validated limit of quantification (LOQ) of 0.005 mg/kg. An independent validation (ILV) of this method was performed in high water, high acid, high oil content matrices and in dry matrices at the LOQ of 0.01 mg/kg (EFSA, 2017).

It is concluded that a sufficiently validated analytical method is available to determine propaquizafop residues (as quizalofop) in the crops under consideration.

1.1.5. Stability of residues in plants

The storage stability of propaquizafop has not been investigated, but the available studies with quizalofop-P-ethyl and quizalofop-P were considered sufficient to address the storage stability of propaquizafop and other ester variants of quizalofop-P (EFSA, 2017). In high water content commodities – relevant for the current assessment – the stability of quizalofop-P-ethyl and quizalofop-P was demonstrated for 28 months in samples stored -20°C (EFSA, 2017).

1.1.6. Proposed residue definitions

In Regulation (EC) No 396/2005, currently two separate enforcement residue definitions are established for propaquizafop (propaquizafop) and for quizalofop-P (quizalofop, including quizalofop-P).

In the framework of the MRL review which was performed for the three substances propaquizafop, quizalofop-P-ethyl and quizalofop-P-tefuryl, EFSA proposed, based on the metabolic pattern identified in metabolism studies with quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop and the capabilities of enforcement analytical methods, the following residue definition for enforcement and risk assessment that covers the three compounds:

- Sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers) (EFSA, 2017)

The proposed revision of the residue definition for enforcement has been agreed in the MRL regulation which was voted at the PAFF committee in February 2019.

EFSA assessed the current application in view of the revised residue definition, anticipating the entry into force of the new enforcement residue definition. Thus, the MRL proposals and the risk assessment values derived in this reasoned opinion refer to the revised residue definition agreed in the PAFF committee.

1.2. Magnitude of residues in plants

1.2.1. Magnitude of residues in primary crops

In support of the intended use of propaquizafop in southern Europe on lettuce, the applicant submitted in total 13 GAP-compliant residue trials on lettuce. Two trials were not considered independent and data from only one trial (on open leaf lettuce) were selected. Seven of the trials (including the replicate trial) were already assessed in the previous EFSA reasoned opinion on the modification of the existing MRLs for propaquizafop (EFSA, 2016). The applicant provided six additional residue trials, performed in Spain, France and Italy in 2012 and 2013. In one trial, two field samples were analysed for residues; EFSA selected the average value from the replicate field samples.

Upon the request of EFSA to clarify the type of lettuce varieties, the applicant informed that three of the submitted trials were performed with a head forming lettuce variety and that in one trial the variety could not be specified (Italy, 2018). These trials were excluded from the data set used for the extrapolation purposes.

Consequently, eight residue trials on open leaf varieties of lettuce were considered valid to support the SEU use and were used to derive a MRL proposal by extrapolation for the whole group of lettuces and salad plants.

Residue trial samples were analysed using different methods that determine either propaquizafop alone or after its hydrolysis to 2-methoxy-6-chloroquinoxaline or as quizalofop after hydrolysis. Where residues were measured as propaquizafop, these were recalculated to quizalofop, using a molecular weight conversion factor.³ The residue results below the respective LOQs were not converted.

The samples of the trials were not stored longer than the interval for which the storage stability is demonstrated. The analytical methods used to analyse trial samples were sufficiently validated and are considered fit for purpose (Italy, 2018).

The submitted residue data indicate that for the intended SEU use of propaquizafop on lettuces and salad plants an MRL of 0.15 mg/kg would be required. This MRL proposal refers to the enforcement residue definition 'sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop'.

³ MW quizalofop 344.8, MW of propaquizafop 443.9.

The existing tentative EU MRL for quizalofop for lettuces and other salad plants is set at a higher level of 0.20 mg/kg and therefore no modification is proposed in the framework of the current assessment.

1.2.2. Magnitude of residues in rotational crops

Based on the confined rotational crop studies conducted at twice the intended application rate of propaquizafop on lettuce, it is concluded that no residues are expected in rotational crops if propaquizafop is applied on lettuce according to the intended GAP (EFSA, 2017).

1.2.3. Magnitude of residues in processed commodities

Processing studies with salad crops have not been submitted in the framework of the current application and are not considered necessary, since the majority of lettuce is eaten fresh (except escarole). The submission of processing studies with escarole is not triggered but would be desirable.

1.2.4. Proposed MRLs

The number of submitted residue trials is sufficient to derive a MRL proposal of 0.15 mg/kg for quizalofop for the whole group of lettuces and salad plants in support of the intended SEU use of propaquizafop.

Since the existing tentative EU MRL for quizalofop in lettuces and other salad plants is set at a higher level of 0.2 mg/kg,⁴ a modification is not proposed in the framework of the current assessment.

For the existing tentative MRL for lettuces and other salad plants, the following confirmatory data were requested in the framework of the MRL review (EFSA, 2017):

- quizalofop-P-ethyl:
 - for lamb's lettuce: four residue trials representative for the SEU use and four trials representative for the northern Europe (NEU) GAP
 - for cresses, land cresses, roman rocket, red mustards: four residue trials representative for the SEU GAP.
- propaquizafop:
 - for lamb's lettuce, cresses, land cresses, roman rockets, red mustards, baby leaf crops: eight residue trials representative for the SEU GAP.

The data gaps identified for quizalofop-P-ethyl are unaffected by the current assessment.

Considering that the intended GAPs of propaquizafop on lamb's lettuce, cresses, land cresses, Roman rocket, red mustards and baby leaf crops refer to less critical uses than assessed by the MRL review, the data provided for the current MRL application does not address the requested confirmatory data identified as unavailable for propaquizafop. Thus, the footnotes in the MRL regulation⁴ should remain unchanged.

If confirmatory data requested for lettuces and other salad plants are not provided within the timelines, the MRL proposal of 0.15 mg/kg derived in the current assessment could be used as an alternative fall-back MRL.

2. Residues in livestock

Salad plants are not livestock feed and therefore the nature and magnitude of propaquizafop residues in livestock was not investigated in the framework of this assessment.

3. Consumer risk assessment

In the framework of the MRL review a comprehensive consumer exposure to residues arising in food from the existing EU uses of quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop was calculated using the revision 2 of the EFSA PRIMo (EFSA, 2007) and considering the acceptable daily intake (ADI) value set for quizalofop-P-ethyl and the acute reference dose (ARfD) set for quizalofop-P-

⁴ EU MRLs and related footnotes voted on 21–22 February 2019, at the Standing Committee on Plants, Animals, Food and Feed (PAFF committee). Draft Regulation SANTE/10482/2018. Not published at the time of publication of this reasoned opinion.

tefuryl (EFSA, 2009b). The toxicological reference values were recalculated as quizalofop equivalents (ADI 0.0083 mg/kg body weight per day and ARfD 0.08 mg/kg body weight) (EFSA, 2017).

In the framework of the current assessment, the risk assessment was performed using the revision 3 of the EFSA PRIMo (EFSA, 2018a). The input values for the exposure assessment were the risk assessment values derived by the MRL review corresponding to the MRLs as established in the new MRL Regulation (SANTE/10482/2018) and for maize as derived in the recent MRL application (EFSA, 2018b). The input values are summarized in Appendix D.1.

For lettuce crops assessed in the current MRL application, the existing tentative MRLs were used as input values, considering that these uses are not fully supported by residue trials and the MRL can be used as a conservative surrogate for the risk assessment values. The crops for which authorised uses were not reported in the MRL review, and crops for which the MRLs were lowered to the LOQ following the MRL review because the assessed uses were not supported by data, were excluded from the exposure calculation.

The maximum estimated long-term dietary intake accounted for 26% of the ADI (NL toddler diet). No short-term intake concerns were identified for any of the crops under assessment.

EFSA concluded that the long-term and short-term intake of residues occurring in food from the existing uses of quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop and from the intended less critical SEU use of propaquizafop on lettuces and other salad plants, is unlikely to present a risk to consumer health.

Further details on the exposure calculations (a screenshot of the Report sheet of the PRIMo) are presented in Appendix C.

4. Conclusion and Recommendations

The data submitted in support of this MRL application were found to be sufficient to derive an MRL proposal of 0.15 mg/kg for quizalofop for the whole group of lettuces and salad plants in support of the intended SEU use of propaquizafop. The existing tentative EU MRL for quizalofop is set at a higher level of 0.2 mg/kg and no modification is thus proposed in the framework of the current assessment. If the requested confirmatory data for lettuces and other salad plants are not addressed within the timelines defined in the MRL Regulation, the MRL proposal of 0.15 mg/kg derived in the current assessment could be used as an alternative fall-back MRL.

EFSA concluded that the long-term and short-term intake of residues occurring in food from the existing uses of quizalofop-P-ethyl, quizalofop-P-tefuryl and propaquizafop and from the intended less critical SEU use of propaquizafop on lettuces and other salad plants, is unlikely to present a risk to consumer health.

The MRL recommendations are summarised in Appendix B.4.

References

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Abbreviations

a.i.	active ingredient
a.s.	active substance
ADI	acceptable daily intake
ARfD	acute reference dose
BBCH	growth stages of mono- and dicotyledonous plants
bw	body weight
DALA	days after last application
DAR	draft assessment report
DAT	days after treatment
EC	emulsifiable concentrate
EMS	evaluating Member State
eq.	residue expressed as a.s. equivalent
GAP	Good Agricultural Practice
HPLC–MS/MS	high-performance liquid chromatography with tandem mass spectrometry
HR	highest residue
IEDI	international estimated daily intake
IESTI	international estimated short-term intake
ILV	independent laboratory validation
InChiKey	International Chemical Identifier Key
ISO	International Organisation for Standardisation
IUPAC	International Union of Pure and Applied Chemistry
LOQ	limit of quantification
MRL	maximum residue level
MS	Member States
MW	molecular weight
NEU	northern Europe

OECD	Organisation for Economic Co-operation and Development
PAFF	Standing Committee on Plants, Animals, Food and Feed
PBI	plant-back interval
PF	processing factor
PHI	preharvest interval
PRIMo	(EFSA) Pesticide Residues Intake Model
RA	risk assessment
RD	residue definition
SANCO	Directorate-General for Health and Consumers
SC	suspension concentrate
SEU	southern Europe
SMILES	simplified molecular-input line-entry system
STMR	supervised trials median residue
TRR	total radioactive residue
WHO	World Health Organization

Appendix A – Summary of intended GAP triggering the amendment of existing EU MRLs

Crop name	Region	Country ISO code	Outdoor/ Indoor	Pests controlled	active substance	Type ^(a)	Content conc. (expressed as a.s.)	Content Unit	Method	Growth stage from BBCH ^(b)	Max. number	Min. water amount	Max. water amount	Unit for water amount	Min. application rate (expressed as a.s.)	Max. application rate (expressed as a.s.)	Unit for application rate	PHI or waiting period (days)
Lettuces	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Lettuces	SEU	EL	Outdoor	Annual and perennial grasses	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	600	L/ha	0.08	0.15	kg a.i./ha	30
Lamb's lettuce/ corn salads	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Escaroles/ broad-leaved endives	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Cress and other sprouts and shoots	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Land cress	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Roman rocket/ rucola	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Red mustards	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30
Baby leaf crops (including brassica species)	SEU	IT	Outdoor	Grass weeds	Propaqui zafop	EC	100.0	g/L	Foliar treatment – general	11	1	200	400	L/ha	0.08	0.12	kg a.i./ha	30

GAP: Good Agricultural Practice; MRL: maximum residue level; NEU: northern European Union; SEU: southern European Union; MS: Member State; a.s.: active substance; EC: emulsifiable concentrate; a.i.: active ingredient; PHI: preharvest interval.

(a): CropLife International Technical Monograph no 2, 6th Edition. Revised May 2008. Catalogue of pesticide formulation types and international coding system.

(b): Growth stage range from first to last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including, where relevant, information on season at time of application.

Appendix B – List of end points

B.1. Residues in plants

B.1.1. Nature of residues and methods of analysis in plants

B.1.1.1. Metabolism studies, methods of analysis and residue definitions in plants

Primary crops (available studies)	Propaquizafop			
	Crop groups	Crop(s)	Application(s)	Sampling ^(a)
	Root crops	Sugar beets ^(b)	Foliar, 2 × 200 g a.s./ha	98–114 DALA
	Leafy crops	Lettuce ^(c)	Foliar, 1 × 200 g a.s./ha	77 DAT
		Lettuce ^(d)	Foliar, 1 × 1000 g a.s./ha	77 DAT
	Pulses/oilseeds	Cotton ^(c)	Onto leaf, 180 g a.s./ha	0–51 DAT
		Cotton ^(b)	Foliar, 1 × 200 g a.s./ha	0, 6, 12, 22 DAT
		Cotton ^(d)	Foliar, 1 × 214 g a.s./ha	0, 15, 22 DALA
		Soybeans ^(d)	Onto leaf, 1 × 100 g a.s./ha	0–28
			Foliar, 1 × 190 g a.s./ha	0, 7, 14 DAT
			Foliar, 2 × 268–298 g a.s./ha	66,70 DAT
	Soybeans ^(b)	Foliar, 1 × 200 g a.s./ha	8, 15 DAT	
	Foliar, 2 × 280 g a.s./ha	66, 100 DALA		
Source: Italy (2005); EFSA (2017)				
Rotational crops (available studies)	Propaquizafop			
	Crop groups	Crop(s)	Application(s)	PBI ^(e)
	Root/tuber crops	Sugar beet ^(b)	Soybeans, 2 × 280 g a.s./ha	30, 120, 270
	Leafy crops	Spinach ^(b)	Soybeans, 2 × 280 g a.s./ha	30, 120, 270
	Cereal (small grain)	Wheat ^(b)	Soybeans, 2 × 280 g a.s./ha	30, 120, 270
	Source: Italy (2005); EFSA (2017)			
Processed commodities (hydrolysis study)	Propaquizafop			
	Conditions			Investigated?
	Pasteurisation (20 min, 90°C, pH 4)			No
	Baking, brewing and boiling (60 min, 100°C, pH 5)			No
	Sterilisation (20 min, 120°C, pH 6)			No
	Not available for propaquizafop but not required since study performed with quizalofop in the framework of the MRL review is expected to cover all three ester variants (EFSA, 2017)			

(a): DAT: days after treatment, DALA: days after the last application.

(b): Quinoxaline-labelled propaquizafop.

(c): Hydroquinone and chlorophenyl-labelled propaquizafop.

(d): Hydroquinone-labelled propaquizafop.

(e): Days after harvest of the treated soybeans.

Can a general residue definition be proposed for primary crops?	Yes	EFSA (2017)
Rotational crop and primary crop metabolism similar?	Yes	EFSA (2017)
Residue pattern in processed commodities similar to residue pattern in raw commodities?	Yes	EFSA (2017)
Plant residue definition for monitoring (RD-Mo)	MRL review (EFSA, 2017, MRL regulation voted in PAFF committee (SANTE/10482/2018)): Sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers)	
Plant residue definition for risk assessment (RD-RA)	MRL review (EFSA, 2017): Sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers)	
Methods of analysis for monitoring of residues (analytical technique, crop groups, LOQs)	Matrices with high water content (apple, tomato), high oil content (oilseed rape) and high starch content/dry matrices (wheat grain): HPLC-MS/MS, LOQ 0.005 mg/kg, determined as quizalofop (acid). ILV available (EFSA, 2017; Italy, 2018)	

PBI: plant-back interval; HPLC-MS/MS: high-performance liquid chromatography with tandem mass spectrometry; MRL: maximum residue level; LOQ: limit of quantification; ILV: independent laboratory validation.

B.1.1.2. Stability of residues in plants

Plant products (available studies)	Category	Commodity	T (°C)	Stability period		Compounds covered	Comment/ Source
				Value	Unit		
	High water content	Snap beans	-20	28	Months	Sum of quizalofop-p-ethyl and quizalofop-P	The storage stability studies are expected to cover all compounds included in the residue definition (EFSA, 2017)
	High oil content	Cotton seeds/rape seeds	-20	28	Months		
	Dry/High starch	Wheat grain	-18	12	Months		
	High acid content	Oranges	-18	12	Months		
	Other	GM maize stover, forage	-20	13	Months	Sum of quizalofop-p-ethyl and quizalofop-P	EFSA (2018b)
	Processed	GM maize oil, flour	-20	13	Months		
		GM maize starch	-20	13	Months		

B.1.2. Magnitude of residues in plants

B.1.2.1. Summary of residues data from the supervised residue trials

Commodity	Region/ Indoor ^(a)	Residue levels observed in the supervised residue trials (mg/kg)	Comments/Source	Calculated MRL (mg/kg)	HR ^(b) (mg/kg)	STMR ^(c) (mg/kg)
Enforcement and risk assessment residue definition: Sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers) (EFSA, 2017)						
Lettuces and salad plants (1 × 150 g/ha, PHI 30 d)	SEU	Open leaf varieties of lettuce: 3 × < 0.005; 0.005; 0.011; 2 × < 0.02; 0.074	Sufficient residue trials on open leaf lettuce varieties compliant with GAP are available to derive a MRL proposal by extrapolation to the whole group of lettuces and salad plants (0251000)	0.15	0.074	0.01
		Head forming varieties of lettuce: 2 × < 0.005; < 0.02; 0.026	The additional residue trials in head forming varieties are considered supplementary information and are not used to derive an MRL proposal			

MRL: maximum residue level; GAP: Good Agricultural Practice.

(a): SEU: Outdoor trials conducted in southern Europe.

(b): Highest residue. The highest residue for risk assessment refers to the whole commodity and not to the edible portion.

(c): Supervised trials median residue. The median residue for risk assessment refers to the whole commodity and not to the edible portion.

B.1.2.2. Residues in rotational crops

Residues in rotational and succeeding crops expected based on confined rotational crop study?	Based on confined rotational crop studies it is concluded that no residues are expected in rotational crops if propaquizafop is applied on lettuce according to the intended GAP
Residues in rotational and succeeding crops expected based on field rotational crop study?	Not available and not required (EFSA, 2017)

GAP: Good Agricultural Practice.

B.1.2.3. Processing factors

No processing studies were submitted in the framework of the present MRL application.

B.2. Residues in livestock

Not relevant.

B.3. Consumer risk assessment

ARfD	0.08 mg/kg bw (ARfD of 0.1 mg/kg bw derived for quizalofop-P-tefuryl (EFSA, 2009b), recalculated to quizalofop equivalents) (EFSA, 2017)
Highest IESTI, according to EFSA PRIMo	Escarole and lettuces: 10% of the ARfD Remaining lettuces: < 10% of the ARfD
Assumptions made for the calculations	Risk assessment based on EFSA PRIMo rev. 3 The input values were HR values as reported by the MRL review for those commodities for which the respective MRLs are supported in the draft MRL Regulation (SANTE/10482/2018). The crops for which authorised uses were not reported in the MRL review, and crops for which the MRLs were lowered to the LOQ following the MRL review because the assessed uses were not supported by data, were excluded from the exposure calculation
ADI	0.0083 mg/kg bw per day (ADI of 0.009 mg/kg bw per day derived for quizalofop-P-ethyl (EFSA, 2009b), recalculated to quizalofop equivalents) (EFSA, 2017)
Highest IEDI, according to EFSA PRIMo	26% ADI (NL toddler)
Assumptions made for the calculations	Risk assessment based on EFSA PRIMo rev. 3 The input values were STMR values as reported by the MRL review for those commodities for which the respective MRLs are supported in the draft MRL Regulation (SANTE/10482/2018). The crops for which authorised uses were not reported in the MRL review, and crops for which the MRLs were lowered to the LOQ following the MRL review because the assessed uses were not supported by data, were excluded from the exposure calculation

ARfD: acute reference dose; bw: body weight; IESTI: international estimated short-term intake; PRIMo: (EFSA) Pesticide Residues Intake Model; HR: highest residue; MRL: maximum residue level; LOQ: limit of quantification; ADI: acceptable daily intake; IEDI: international estimated daily intake; STMR: supervised trials median residue.

B.4. Recommended MRLs

Code ^(a)	Commodity	Existing EU MRL (mg/kg)	Proposed EU MRL (mg/kg)	Comment/justification
Enforcement residue definition: Sum of quizalofop, its salts, its esters (including propaquizafop) and its conjugates, expressed as quizalofop (any ratio of constituent isomers) (SANTE/10482/2018; EFSA, 2017)				
0251000	Lettuces and salad plants	0.2 ^(ft)	0.2 ^(ft)	<p>The submitted data are sufficient to derive a MRL proposal of 0.15 mg/kg for the intended SEU use of propaquizafop. Since the tentative MRL derived in the framework of MRL review is based on a more critical GAP, the existing MRL should not be modified at the moment.</p> <p>If the confirmatory data requested in the framework of the MRL review will not be provided, the MRL proposal of 0.15 mg/kg can be used as a fully supported fall-back MRL representing a SEU GAP (1 application of 0.12 kg propaquizafop/ha, PHI 30 days).</p> <p>The existing tentative MRL and the proposed fall-back MRL are unlikely to pose a risk for consumers.</p>

MRL: maximum residue level; GAP: Good Agricultural Practice; SEU: southern Europe; PHI: preharvest interval.

(a): Commodity code number according to Annex I of Regulation (EC) No 396/2005.

(ft): SANTE/10482/2018: The European Food Safety Authority identified some information on residue trials as unavailable for propaquizafop. When re-viewing the MRL, the Commission will take into account the information referred to in the first sentence, if it is submitted by [2 years after publication], or, if that information is not submitted by that date, the lack of it.

Appendix C – Pesticide Residue Intake Model (PRIMo)

<p>European Food Safety Authority EFSA PRIMo revision 3.1; 2019/03/19</p>		Quizalofop				Input values					
		LOQs (mg/kg) range from: 0.01 to: 0.05				Details – chronic risk assessment					
		Toxicological reference values				Supplementary results – chronic risk assessment					
		ADI (mg/kg bw per day): 0.0083		ARID (mg/kg bw): 0.08		Details – acute risk assessment/children					
Source of ADI: EFSA		Source of ARID: EFSA		Details – acute risk assessment/adults							
Year of evaluation: 2009		Year of evaluation: 2009									
Comments:											
Refined calculation mode											
Chronic risk assessment: JMPR methodology (IED/TMDI)											
No of diets exceeding the ADI: ---											
TMDI/IED/IEI calculation (based on average food consumption)	Calculated exposure (% of ADI)	MS Diet	Exposure (µg/kg bw per day)	Highest contributor to MS diet (in % of ADI)	Commodity / group of commodities	2nd contributor to MS diet (in % of ADI)	Commodity / group of commodities	3rd contributor to MS diet (in % of ADI)	Commodity / group of commodities	MRLs set at the LOQ (in % of ADI)	Exposure resulting from commodities not under assessment (in % of ADI)
	26%	NL toddler	2.12	7%	Milk: Cattle	3%	Rapeseeds/canola seeds	3%	Apples		26%
	15%	NL child	1.28	4%	Sugar beet roots	3%	Milk: Cattle	2%	Potatoes		15%
	11%	UK infant	0.83	5%	Milk: Cattle	2%	Potatoes	1.0%	Carrots		11%
	11%	DE child	0.91	3%	Apples	2%	Milk: Cattle	1%	Potatoes		11%
	10%	FR child 3 15 yr	0.84	3%	Milk: Cattle	2%	Sugar beet roots	0.7%	Potatoes		10%
	10%	FR toddler 2 3 yr	0.84	4%	Milk: Cattle	1%	Sugar beet roots	0.9%	Potatoes		10%
	10%	GEMS/Food G07	0.82	2%	Potatoes	2%	Rapeseeds/canola seeds	0.9%	Soyabeans		10%
	10%	GEMS/Food G10	0.82	2%	Soyabeans	1%	Potatoes	0.8%	Lettuces		10%
	10%	GEMS/Food G08	0.79	2%	Potatoes	0.9%	Soyabeans	0.9%	Rapeseeds/canola seeds		10%
	9%	UK toddler	0.75	2%	Milk: Cattle	2%	Potatoes	2%	Sugar beet roots		9%
	9%	GEMS/Food G11	0.75	2%	Potatoes	2%	Soyabeans	0.9%	Milk: Cattle		9%
	9%	GEMS/Food G15	0.75	2%	Potatoes	0.8%	Milk: Cattle	0.8%	Soyabeans		9%
	9%	RO general	0.73	2%	Potatoes	1%	Milk: Cattle	1.0%	Sunflower seeds		9%
	8%	SE general	0.69	2%	Potatoes	1%	Milk: Cattle	1%	Bovine: Muscle/meat		8%
	8%	GEMS/Food G06	0.63	1.0%	Potatoes	0.9%	Rice	0.7%	Sugar beet roots		8%
	7%	NL general	0.62	1%	Sugar beet roots	1%	Potatoes	1%	Milk: Cattle		7%
	7%	DE women 14-50 yr	0.61	2%	Sugar beet roots	1%	Milk: Cattle	0.6%	Apples		7%
	7%	DE general	0.59	2%	Sugar beet roots	1%	Milk: Cattle	0.6%	Potatoes		7%
	7%	ES child	0.57	2%	Milk: Cattle	1%	Lettuces	0.9%	Potatoes		7%
	7%	DK child	0.54	2%	Milk: Cattle	1%	Potatoes	1.0%	Carrots		7%
	6%	PT general	0.52	3%	Potatoes	0.6%	Wine grapes	0.5%	Carrots		6%
	6%	IE adult	0.52	1%	Potatoes	0.5%	Milk: Cattle	0.3%	Wine grapes		6%
	6%	FR infant	0.50	2%	Milk: Cattle	0.9%	Potatoes	0.8%	Carrots		6%
5%	FI 3 yr	0.39	2%	Potatoes	2%	Carrots	0.3%	Rice		5%	
5%	ES adult	0.39	1%	Lettuces	0.6%	Milk: Cattle	0.4%	Potatoes		5%	
4%	FR adult	0.35	0.6%	Wine grapes	0.5%	Milk: Cattle	0.4%	Sugar beet roots		4%	
4%	LT adult	0.32	2%	Potatoes	0.5%	Milk: Cattle	0.4%	Apples		4%	
4%	FI 6 yr	0.32	2%	Potatoes	0.4%	Carrots	0.3%	Rice		4%	
3%	PL general	0.29	2%	Potatoes	0.5%	Apples	0.2%	Head cabbages		3%	
3%	UK vegetarian	0.28	0.7%	Potatoes	0.4%	Milk: Cattle	0.3%	Lettuces		3%	
3%	DK adult	0.28	0.6%	Milk: Cattle	0.6%	Potatoes	0.4%	Carrots		3%	
3%	UK adult	0.27	0.7%	Potatoes	0.4%	Milk: Cattle	0.3%	Lettuces		3%	
3%	IT adult	0.24	0.9%	Lettuces	0.4%	Other lettuce and other salad plants	0.3%	Potatoes		3%	
3%	IT toddler	0.23	0.7%	Lettuces	0.4%	Potatoes	0.3%	Other lettuce and other salad plants		3%	
2%	FI adult	0.16	0.6%	Potatoes	0.3%	Lettuces	0.2%	Carrots		2%	
2%	IE child	0.13	0.4%	Milk: Cattle	0.3%	Potatoes	0.2%	Rice		2%	
Conclusion: The estimated long-term dietary intake (TMDI/IED/IEI) was below the ADI. The long-term intake of residues of quizalofop is unlikely to present a public health concern.											

Acute risk assessment/children	Acute risk assessment/adults/general population
Details – acute risk assessment/children	Details – acute risk assessment/adults

The acute risk assessment is based on the ARfD.
The calculation is based on the large portion of the most critical consumer group.

Show results for all crops

Unprocessed commodities	Results for children				Results for adults			
	No. of commodities for which ARfD/ADI is exceeded (IESTI):				No. of commodities for which ARfD/ADI is exceeded (IESTI):			
	---				---			
	IESTI				IESTI			
	Highest % of ARfD/ADI	Commodities	MRL / input for RA (mg/kg)	Exposure (µg/kg bw)	Highest % of ARfD/ADI	Commodities	MRL / input for RA (mg/kg)	Exposure (µg/kg bw)
19%	Cauliflowers	0.4 / 0.26	15	11%	Head cabbages	0.6 / 0.2	8.4	
15%	Potatoes	0.1 / 0.08	12	8%	Broccoli	0.4 / 0.26	6.2	
14%	Broccoli	0.4 / 0.26	11	8%	Cauliflowers	0.4 / 0.26	6.0	
11%	Head cabbages	0.6 / 0.2	8.8	5%	Escaroles/broad-leaved	0.2 / 0.2	4.0	
10%	Escaroles/broad-leaved	0.2 / 0.2	8.0	3%	Lettuces	0.2 / 0.2	2.4	
10%	Lettuces	0.2 / 0.2	7.6	3%	Potatoes	0.1 / 0.08	2.4	
8%	Carrots	0.2 / 0.1	6.3	2%	Carrots	0.2 / 0.1	2.0	
5%	Parsnips	0.2 / 0.1	3.6	2%	Swedes/rutabagas	0.06 / 0.05	1.7	
4%	Celeriacs/turnip rooted	0.08 / 0.06	3.3	2%	Parsnips	0.2 / 0.1	1.4	
4%	Salsifis	0.2 / 0.1	3.1	2%	Aubergines/egg plants	0.05 / 0.05	1.4	
4%	Tomatoes	0.05 / 0.05	2.9	2%	Beans (with pods)	0.3 / 0.17	1.3	
4%	Beetroots	0.06 / 0.05	2.9	1%	Beetroots	0.06 / 0.05	1.2	
3%	Pears	0.02 / 0.02	2.8	1%	Salsifis	0.2 / 0.1	1.1	
3%	Spinaches	0.2 / 0.12	2.7	1%	Red mustards	0.2 / 0.2	1.1	
3%	Swedes/rutabagas	0.06 / 0.05	2.6	1%	Radishes	0.2 / 0.1	1.0	
Expand/collapse list								
Total number of commodities exceeding the ARfD/ADI in children and adult diets (IESTI calculation)								

Processed commodities	Results for children				Results for adults			
	No of processed commodities for which ARfD/ADI is exceeded (IESTI):				No of processed commodities for which ARfD/ADI is exceeded (IESTI):			
	---				---			
	IESTI				IESTI			
	Highest % of ARfD/ADI	Processed commodities	MRL / input for RA (mg/kg)	Exposure (µg/kg bw)	Highest % of ARfD/ADI	Processed commodities	MRL / input for RA (mg/kg)	Exposure (µg/kg bw)
26%	Broccoli / boiled	0.4 / 0.26	20	14%	Cauliflowers / boiled	0.4 / 0.26	11	
23%	Cauliflowers / boiled	0.4 / 0.26	18	8%	Broccoli / boiled	0.4 / 0.26	6.3	
17%	Escaroles/broad-leaved endiv	0.2 / 0.2	13	5%	Escaroles/broad-leaved	0.2 / 0.2	4.1	
9%	Potatoes / fried	0.1 / 0.08	7.5	3%	Parsnips / boiled	0.2 / 0.1	2.1	
6%	Parsnips / boiled	0.2 / 0.1	5.1	2%	Beetroots / boiled	0.06 / 0.05	1.9	
6%	Sugar beets (root) / sugar	0.06 / 0.48	4.4	2%	Sugar beets (root) / sugar	0.06 / 0.48	1.8	
3%	Salsifis / boiled	0.2 / 0.1	2.6	1%	Celeriacs / boiled	0.08 / 0.06	1.1	
3%	Potatoes / dried (flakes)	0.1 / 0.18	2.4	1%	Beans / canned	0.2 / 0.14	1.0	
3%	Beetroots / boiled	0.06 / 0.05	2.2	1%	Spinaches / frozen; boiled	0.2 / 0.12	0.99	
3%	Carrots / juice	0.2 / 0.06	2.2	1%	Salsifis / boiled	0.2 / 0.1	0.82	
3%	Beans (with pods) / boiled	0.3 / 0.17	2.1	1.0%	Turnips / boiled	0.08 / 0.04	0.76	
3%	Turnips / boiled	0.08 / 0.04	2.0	0.8%	Apples / juice	0.02 / 0.02	0.67	
2%	Spinaches / frozen; boiled	0.2 / 0.12	1.7	0.6%	Chards/beet leaves / boiled	0.04 / 0.04	0.50	
2%	Jerusalem artichokes / boiled	0.08 / 0.06	1.5	0.6%	Carrots / canned	0.2 / 0.06	0.49	
2%	Chards/beet leaves / boiled	0.04 / 0.04	1.2	0.6%	Jerusalem artichokes / boiled	0.08 / 0.06	0.49	
Expand/collapse list								

Conclusion:
No exceedance of the toxicological reference value was identified for any unprocessed commodity.
A short-term intake of residues of quizalofop is unlikely to present a public health risk.
For processed commodities, no exceedance of the ARfD/ADI was identified.

Appendix D – Input values for the exposure calculations

D.1. Consumer risk assessment

Commodity	Proposed MRL (SANTE/ 10482/2018)	Chronic risk assessment		Acute risk assessment	
		Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Grapefruits	0.02	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Oranges	0.02	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Lemons	0.02	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Limes	0.02	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Mandarins	0.02	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Almonds	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Brazil nuts	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Cashew nuts	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Chestnuts	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Coconuts	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Hazelnuts/ cobluts	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Macadamia	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Pecans	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Pine nut kernels	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Pistachios	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Walnuts	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Apples	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Pears	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Quinces	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Medlar	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Loquats/ Japanese medlars	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Apricots	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Cherries (sweet)	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Peaches	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Plums	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Table grapes	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Wine grapes	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Strawberries	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Blackberries	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Dewberries	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Raspberries (red and yellow)	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Kumquats	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Potatoes	0.1	0.04	STMR (EFSA, 2017)	0.08	HR (EFSA, 2017)
Beetroots	0.06	0.04	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Carrots	0.2	0.06	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)
Celeriacs/turnip rooted celeries	0.08	0.02	STMR (EFSA, 2017)	0.06	HR (EFSA, 2017)
Horseradishes	0.08	0.02	STMR (EFSA, 2017)	0.06	HR (EFSA, 2017)
Jerusalem artichokes	0.08	0.02	STMR (EFSA, 2017)	0.06	HR (EFSA, 2017)
Parsnips	0.2	0.06	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)

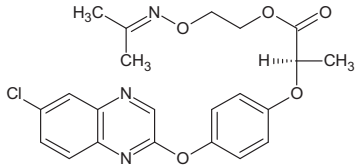
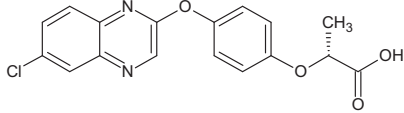
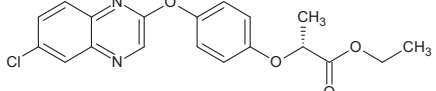
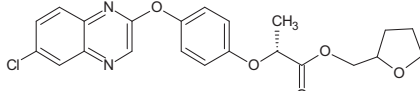
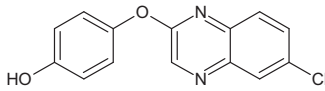
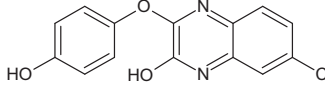
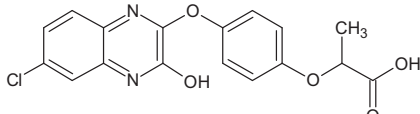
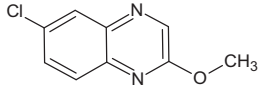
Commodity	Proposed MRL (SANTE/ 10482/2018)	Chronic risk assessment		Acute risk assessment	
		Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Parsley roots/ Hamburg roots parsley	0.2	0.06	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)
Radishes	0.2	0.06	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)
Salsifies	0.2	0.06	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)
Swedes/ rutabagas	0.06	0.04	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Turnips	0.08	0.03	STMR (EFSA, 2017)	0.04	HR (EFSA, 2017)
Garlic	0.04	0.04	STMR (EFSA, 2017)	0.04	HR (EFSA, 2017)
Onions	0.04	0.04	STMR (EFSA, 2017)	0.04	HR (EFSA, 2017)
Shallots	0.04	0.04	STMR (EFSA, 2017)	0.04	HR (EFSA, 2017)
Tomatoes	0.05	0.01	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Aubergines/egg plants	0.05	0.01	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Broccoli	0.4	0.06	STMR (EFSA, 2017)	0.26	HR (EFSA, 2017)
Cauliflowers	0.4	0.06	STMR (EFSA, 2017)	0.26	HR (EFSA, 2017)
Head cabbages	0.6	0.05	STMR (EFSA, 2017)	0.2	HR (EFSA, 2017)
Lamb's lettuce/ corn salads	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Lettuces	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Escaroles/broad- leaved endives	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Cress and other sprouts and shoots	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Land cress	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Roman rocket/ rucola	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Red mustards	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Baby leaf crops (including brassica species)	0.2	0.2	MRL (EFSA, 2017)	0.2	MRL (EFSA, 2017)
Spinaches	0.2	0.02	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Chards/beet leaves	0.04	0.04	STMR (EFSA, 2017)	0.04	HR (EFSA, 2017)
Chervil	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Chives	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Celery leaves	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Parsley	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Sage	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Rosemary	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Thyme	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Basil and edible flowers	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Laurel/bay leaves	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Tarragon	0.2	0.05	STMR (EFSA, 2017)	0.12	HR (EFSA, 2017)
Beans (with pods)	0.3	0.02	STMR (EFSA, 2017)	0.17	HR (EFSA, 2017)
Beans (without pods)	0.2	0.04	STMR (EFSA, 2017)	0.07	HR (EFSA, 2017)

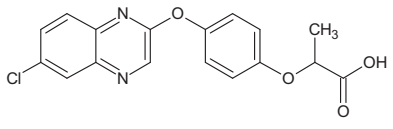
Commodity	Proposed MRL (SANTE/ 10482/2018)	Chronic risk assessment		Acute risk assessment	
		Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Peas (with pods)	0.03	0.01	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Peas (without pods)	0.2	0.03	STMR (EFSA, 2017)	0.11	HR (EFSA, 2017)
Lentils (fresh)	0.2	0.03	STMR (EFSA, 2017)	0.11	HR (EFSA, 2017)
Florence fennels	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Beans	0.2	0.05	STMR (EFSA, 2017)	0.05	STMR (EFSA, 2017)
Lentils	0.2	0.05	STMR (EFSA, 2017)	0.05	STMR (EFSA, 2017)
Peas	0.2	0.05	STMR (EFSA, 2017)	0.05	STMR (EFSA, 2017)
Linseeds	0.3	0.1	STMR (EFSA, 2017)	0.1	STMR (EFSA, 2017)
Poppy seeds	0.7	0.2	STMR (EFSA, 2017)	0.2	STMR (EFSA, 2017)
Sunflower seeds	0.8	0.12	STMR (EFSA, 2017)	0.12	STMR (EFSA, 2017)
Rapeseeds/ canola seeds	2	0.23	STMR (EFSA, 2017)	0.23	STMR (EFSA, 2017)
Soya beans	0.2	0.04	STMR (EFSA, 2017)	0.04	STMR (EFSA, 2017)
Mustard seeds	0.7	0.2	STMR (EFSA, 2017)	0.2	STMR (EFSA, 2017)
Cotton seeds	0.1	0.04	STMR (EFSA, 2017)	0.04	STMR (EFSA, 2017)
Maize/corn	0.02	0.02	STMR (EFSA, 2018b)	0.02	STMR (EFSA, 2017)
Rice	0.05	0.05	STMR (EFSA, 2017)	0.05	STMR (EFSA, 2017)
Chamomile	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Hibiscus/roselle	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Rose	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Jasmine	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Lime/linden	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Strawberry leaves	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Rooibos	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Mate/maté	0.8	0.03	STMR (EFSA, 2017)	0.46	HR (EFSA, 2017)
Anise/aniseed	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Black caraway/ black cumin	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Celery seed	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Coriander seed	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Cumin seed	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Dill seed	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Fennel seed	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Fenugreek	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Nutmeg	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Other spices (seeds)	0.05	0.05	STMR (EFSA, 2017)		HR (EFSA, 2017)
Allspice/pimento	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Sichuan pepper	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Caraway	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Cardamom	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Juniper berry	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Peppercorn (black, green and white)	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Vanilla pods	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Tamarind	0.05	0.05	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)

Commodity	Proposed MRL (SANTE/ 10482/2018)	Chronic risk assessment		Acute risk assessment	
		Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Other spices (fruits)	0.05	0.05	STMR (EFSA, 2017)		HR (EFSA, 2017)
Sugar beet roots	0.06	0.04	STMR (EFSA, 2017)	0.05	HR (EFSA, 2017)
Chicory roots	0.08	0.02	STMR (EFSA, 2017)	0.06	HR (EFSA, 2017)
Swine: Muscle/ meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Swine: Fat tissue	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Swine: Liver	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Swine: Kidney	0.1	0.07	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)
Swine: Edible offals (other than liver and kidney)	0.1	0.07	STMR (EFSA, 2017)	0.1	HR (EFSA, 2017)
Bovine: Muscle/ meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Bovine: Fat tissue	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Bovine: Liver	0.03	0.02	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Bovine: Kidney	0.3	0.16	STMR (EFSA, 2017)	0.22	HR (EFSA, 2017)
Bovine: Edible offals (other than liver and kidney)	0.3	0.16	STMR (EFSA, 2017)	0.22	HR (EFSA, 2017)
Sheep: Muscle/ meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Sheep: Fat tissue	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Sheep: Liver	0.03	0.03	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Sheep: Kidney	0.3	0.17	STMR (EFSA, 2017)	0.24	HR (EFSA, 2017)
Sheep: Edible offals (other than liver and kidney)	0.3	0.17	STMR (EFSA, 2017)	0.24	HR (EFSA, 2017)
Goat: Muscle/ meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Goat: Fat tissue	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Goat: Liver	0.03	0.03	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Goat: Kidney	0.3	0.17	STMR (EFSA, 2017)	0.24	HR (EFSA, 2017)
Goat: Edible offals (other than liver and kidney)	0.3	0.17	STMR (EFSA, 2017)	0.24	HR (EFSA, 2017)
Equine: Muscle/ meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Equine: Fat tissue	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Equine: Liver	0.03	0.02	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Equine: Kidney	0.3	0.16	STMR (EFSA, 2017)	0.22	HR (EFSA, 2017)
Equine: Edible offals (other than liver and kidney)	0.3	0.16	STMR (EFSA, 2017)	0.22	HR (EFSA, 2017)
Poultry: Muscle/ meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Poultry: Fat tissue	0.04	0.03	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Poultry: Liver	0.04	0.03	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)

Commodity	Proposed MRL (SANTE/ 10482/2018)	Chronic risk assessment		Acute risk assessment	
		Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Poultry: Kidney	0.04	0.03	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Poultry: Edible offals (other than liver and kidney)	0.04	0.03	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Other farmed animals: Muscle/meat	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Other farmed animals: Fat tissue	0.02	0.02	STMR (EFSA, 2017)	0.02	HR (EFSA, 2017)
Other farmed animals: Liver	0.03	0.02	STMR (EFSA, 2017)	0.03	HR (EFSA, 2017)
Other farmed animals: Kidney	0.3	0.16	STMR (EFSA, 2017)	0.22	HR (EFSA, 2017)
Other farmed animals: Edible offals (other than liver and kidney)	0.3	0.16	STMR (EFSA, 2017)	0.22	HR (EFSA, 2017)
Milk: Cattle	0.015	0.01	STMR (EFSA, 2017)	0.01	STMR (EFSA, 2017)
Milk: Sheep	0.015	0.01	STMR (EFSA, 2017)	0.01	STMR (EFSA, 2017)
Milk: Goat	0.015	0.01	STMR (EFSA, 2017)	0.01	STMR (EFSA, 2017)
Milk: Horse	0.015	0.01	STMR (EFSA, 2017)	0.01	STMR (EFSA, 2017)
Milk: Others	0.015	0.01	STMR (EFSA, 2017)	0.01	STMR (EFSA, 2017)
Eggs: Chicken	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Eggs: Duck	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Eggs: Goose	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)
Eggs: Quail	0.01	0.01	STMR (EFSA, 2017)	0.01	HR (EFSA, 2017)

Appendix E – Used compound codes

Code/trivial name	Chemical name/SMILES notation/ InChiKey	Structural formula
Propaquizafop-P	2-isopropylideneaminoxyethyl (<i>R</i>)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionate <chem>C/C(C)=N\OCCOC(=O)[C@@H](C)Oc1ccc(cc1)Oc2cnc3cc(Cl)ccc3n2</chem> FROBCXTULYFHEJ-OAHLLOKOSA-N	
Quizalofop-P	(<i>R</i>)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionic acid <chem>O=C(O)[C@@H](C)Oc1ccc(cc1)Oc2cnc3cc(Cl)ccc3n2</chem> ABOOPXYCKNFDNJ-SNVBAGLBSA-N	
Quizalofop-P-ethyl	ethyl (<i>2R</i>)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionate <chem>O=C(OCC)[C@@H](C)Oc1ccc(cc1)Oc2cnc3cc(Cl)ccc3n2</chem> OSUHJPCHFDQAIT-GFCCVEGCSA-N	
Quizalofop-P-tefuryl	(<i>RS</i>)-tetrahydrofurfuryl (<i>R</i>)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionate <chem>O=C(OCC1CCCO1)[C@@H](C)Oc4ccc(Oc2cnc3cc(Cl)ccc3n2)cc4</chem> BBKDWPHJZANJGB-IKJXHCRLSA-N	
Quizalofop-phenol Hydroxy ether (CQOP)	4-(6-chloroquinoxalin-2-yloxy)phenol <chem>Oc1ccc(cc1)Oc2cnc3cc(Cl)ccc3n2</chem> UVYFSLAJRJHGJB-UHFFFAOYSA-N	
Hydroxy-quizalofop-phenol (CQOPOH) Dihydroxy ether	7-chloro-3-(4-hydroxyphenoxy)quinoxalin-2 (<i>1H</i>)-one <chem>Oc1ccc(cc1)Oc2nc3ccc(Cl)cc3nc2O</chem> SUDISTHTCZHOSE-UHFFFAOYSA-N	
Hydroxy-quizalofop	(<i>2RS</i>)-2-{4-[(6-chloro-3-hydroxyquinoxalin-2-yl)oxy]phenoxy}propionic acid <chem>O=C(O)C(C)Oc1ccc(cc1)Oc2nc3ccc(Cl)cc3nc2O</chem> GRVXQVAJWPNYOC-UHFFFAOYSA-N	
methoxy-6-chloroquinoxaline (MCQ)	6-chloro-2-methoxyquinoxaline <chem>Clc1ccc2nc(cnc2c1)OC</chem> DSZWPJSGTPEFJI-UHFFFAOYSA-N	

Code/trivial name	Chemical name/SMILES notation/ InChiKey	Structural formula
Quizalofop	(<i>RS</i>)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy] propionic acid <chem>O=C(O)C(C)Oc1ccc(cc1)Oc2cnc3cc(Cl)ccc3n2</chem> ABOOPXYCKNFDNJ-UHFFFAOYSA-N	

SMILES: simplified molecular-input line-entry system; InChiKey: International Chemical Identifier Key.
(ACD/ChemSketch 2015 ACD/Labs 2015 Release (File version C10H41, Build 75059, 17 December 2014).